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ON THE
RANGE OF TEMPERATURE IN TYPHUS
AND ENTERIC FEVERS.

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IN the following remarks are given the results of thermometric observations of the range of temperature in some cases of typhus and enteric fever. A few of the cases occurred in private practice, the others in hospital.

In order to render more manifest the variations of temperature and pulse, I have had recourse to diagrams. In these the thick line indicates the temperature, and the faint line the pulse. The degree of temperature and rate of pulse indicated by the horizontal lines are so set down as to bring as nearly as possible within the same space the highest and lowest temperature and pulse likely to be observed. A pulse of 72 and a temperature of 98° Fahr. are taken as conveniently and very nearly representing the standard of health; this being indicated more prominently by the thicker horizontal line.¹ The spaces between the vertical lines represent the days of the illness in all those cases whose date of commencement could be ascertained with any approach to correctness; in those cases in which this was not known, they represent merely the current date. By a glance at such a diagram, a very good general idea of the case represented is at once obtained, much more readily than by a perusal of columns of figures and dates; and not unfrequently the case may be so diagnosed without any further knowledge of its symptoms. In a few instances a third line was added, to show the rate of respiration co-existing with the rate of pulse and degree of temperature, but this created an appearance of confusion, and it is preferable when the noting of the rate of respiration is thought desirable to do so by figures.

¹ In children this should be a little higher, especially for the pulse.

These observations have been made by placing the thermometer in the axilla for four or five minutes or longer. There are two observations daily, one about noon, and the other about eight in the evening.¹ Of course, this can, after all, only give an approximation to the actual range of temperature, for it seems evident that the temperature is almost constantly varying, and it can only be by an occasional chance that the observation happens to be made while this is at its maximum or minimum point. To obtain the real range of temperature would require observations so frequent as to be equally out of the question both for patient and observer.

With regard to the application of the thermometer to the investigation of the disease, although it has become more general of late, it may be still considered by some as an unnecessary refinement, and it may be thought that the temperature of the skin can be estimated with quite sufficient accuracy for practical purposes by the mere application of the hand of the observer. That this idea is erroneous may easily be proved by any one who will take the trouble to test the point by first applying the hand and forming his opinion as to the heat of the skin, and then observing the result as given by the thermometer. Not unfrequently the heat of the skin, as estimated by the hand, may seem to be not above what is healthy, while the temperature is in reality, as the thermometer in the axilla will show, several degrees above the normal standard.

It will be seen by a very cursory examination of these diagrams, that although on taking a general view of the temperature and of the rate of pulse over a series of days, they rise and fall very much together, yet this correlation is by no means uniform; a high temperature being very frequently found along with a slow pulse, and a low temperature with a quick pulse, the pulse also frequently rising in rapidity while the temperature falls, and falling while the temperature rises.

In Professor Aitken's work on the 'Science and Practice of Medicine,' he says that as a general rule the correlation of temperature and pulse may be given as follows:

Temperature	98°	corresponds	with a pulse	of	60
"	99°	"	"	"	70
"	100°	"	"	"	80
"	101°	"	"	"	90
"	102°	"	"	"	100
"	103°	"	"	"	110
"	104°	"	"	"	120
"	105°	"	"	"	130
"	106°	"	"	"	140

¹ In some of the cases which occurred in private practice, the morning observation was at an earlier hour, and to the diagrams of these cases a note to that effect is appended.

That is, that for every rise of temperature by one degree, there is an increased frequency of pulse by ten beats per minute. He states, however, that this correlation is not constant, and that it is far from being so is shown by the following table, in which is noted the number of occasions on which each degree of temperature was observed in thirty cases of typhus of eighteen years of age and upwards, with the average pulse, and also the maximum and minimum pulse, which on different occasions were found with each degree of temperature :

Table showing correlation of Temperature and Pulse in thirty cases of Typhus, of eighteen years of age and upwards.

Temperature.	Number of observations.	Average pulse.	Highest and lowest pulse.
— 96°	5	82	64—96
96·1°—97°	39	78	60—112
97·1°—98°	77	77	50—120
98·1°—99°	70	94	60—150
99·1°—100°	60	99	72—164
100·1°—101°	61	104	72—144
101·1°—102°	86	106	84—144
102·1°—103°	140	114	84—156
103·1°—104°	173	115	84—144
104·1°—105°	55	120	96—158
105·1°—106°	1	96	

The average pulse here rises, though very unequally, with each degree of temperature from 77 with 98°, to 120 with 105°. The range of pulse, however, corresponding with any one temperature is very wide, from 50 to 120, for example, with 98°, and from 84 to 156 with 103°. In some cases the disparity between the height of the temperature and the frequency of the pulse is very remarkable, and continues for several days, sometimes throughout the whole case. More particularly does this occur in enteric fever, in some cases of which disease the pulse may be throughout very slightly, if at all, above the natural frequency, while the temperature remains at a high standard. The occurrence of a rapid pulse with a low temperature need not cause surprise, the former being so easily accelerated in weak or nervous patients, even by the slight excitement consequent on the visit of the medical attendant ; but the absence of excitement of the circulatory system while the high temperature shows the existence of much pyrexia is more difficult of explanation.

This table also brings out what was the most common temperature in these thirty cases of typhus. Putting aside the observations below 98°, and forty-six of those between 98° and

99°, as mostly occurring after the commencement of convalescence, we have 600 observations, of which 369 were above 102°; considerably the most frequent temperature was from 103·1° to 104°, this occurring 173 times. A higher temperature than 105° seems to be rare; it was only once observed among these thirty cases, and among seventeen other cases of typhus of ages below eighteen, it was observed only five times, twice in the case of a girl aged thirteen, twice in that of a male aged seventeen, and once in that of a girl aged fifteen; on these five occasions the pulse was twice 108, twice 120, and once 132.

In studying the range of temperature in typhus fever (and in other diseases likewise) one of the first points to arrest the attention is that neither in its rise towards the acme of the fever nor in its subsequent fall is it regularly progressive. It rises one day, falls a little the next, rises again the next to a point higher than it had previously attained, and so on, until the defervescence has commenced, when it descends in a similarly interrupted manner until it has reached or fallen below the normal standard. The same description applies to the acceleration and diminution of the frequency of the pulse before and after the turn of the fever. The evening temperature is most commonly higher than that of the morning, but to this there are very numerous exceptions. The difference between the morning and evening observations is sometimes very considerable; for example, in Diag. III, on the 8th day, it is 2°; in Diag. VI, on the 7th day, it is 2·7°, and on the 11th day, 2·6°; in Diag. IX, on the 7th day 2°, and on the 9th day 3·8°, besides other instances. It is, however, the exception in typhus for the difference to be much above one degree during the period between the 3rd or 4th day and the 10th or 11th; and in this relation of the morning temperature to that of the evening is to be found one point of distinction between the range of temperature of typhus fever and that of enteric. In those cases in which, during the height of the fever, the evening observation was below that of the morning of the same day, the difference was sometimes as much as from 1·7° to 2·4° (see Diag. III, 6th and 8th days; Diag. VII, 7th day; Diag. X, 9th day; and Diag. XVI, 8th day). About the beginning of the defervescence and during its progress, the difference between the morning and evening temperature is most likely to be considerable; and in some cases there may be one or two great fluctuations, but there is not in typhus the prolonged period of oscillating temperature which occurs towards the close of a case of enteric fever.

In typhus fever the day of illness on which the highest temperature occurs is much more uncertain than might have been expected. Twenty-seven cases were regularly observed

morning and evening from not later than the fourth day, and in these, the day on which the highest temperature occurred was as follows :

In 4 cases, maximum temperature occurred on 3rd day.

" 8 "	"	"	4th "
" 3 "	"	"	5th "
" 3 "	"	"	6th "
" 2 "	"	"	7th "
" 1 case	"	"	8th "
" 1 "	"	"	9th "
" 2 cases	"	"	10th "
" 3 "	"	"	11th "

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The early days of the fever would, therefore, seem to be commonly the period of most intense pyrexia, for we see that in twenty out of these twenty-seven cases the highest temperature occurred during the first week, and in twelve of these twenty on the third or fourth day. The difference, however, between the maximum temperature and what occurs up to the commencement of decided defervescence is in some of these cases but trifling in amount. As a general rule, it may be considered that the temperature rises very rapidly during the first two or three days of the case to a point which it rarely much exceeds. In the majority of cases, also, the rise seems to be much more sudden than the defervescence generally is, although it is not so easy to demonstrate this, the patients very rarely coming under observation until the third or fourth day, and seldom even so early as this. Three of these cases, however (Diags. I, XVII, and XX), came under observation, the last on the first day of illness, the other two on the second, and they are in accordance with this opinion.

Very commonly, though not constantly, there is a remission of the temperature during the second half of the first or first half of the second week, this abatement continuing sometimes one day, sometimes several days, after which the temperature again rises before the defervescence begins (see Diags. II, V, VI, VII, IX, XI, XII, &c.). In only four of the twenty-seven cases referred to above, it will be observed, did the highest temperature occur on seventh, eighth, or ninth day.

The day of maximum temperature does not seem at all to correspond with the day of most frequent pulse, being sometimes earlier in the case, sometimes later, by far most frequently the former. This is what might be expected, the mere rapidity of pulse being not so much dependent on the intensity of the febrile condition shown by the elevation of temperature as on the increasing effects of the poison on the whole economy, effects

which in the worst cases rapidly bring down the temperature, while they accelerate the pulse.

The highest temperature observed in each of these twenty-seven cases respectively was as follows :

In 1 case the maximum temperature was 102°				
" 1	"	"	"	102·5°
" 1	"	"	"	102·8°
" 1	"	"	"	103·8°
" 4 cases	"	"	"	104°
" 3	"	"	"	104·2°
" 1 case	"	"	"	104·4°
" 2 cases	"	"	"	104·5°
" 2	"	"	"	104·6°
" 3	"	"	"	104·7°
" 5	"	"	"	104·8°
" 1 case	"	"	"	105·1°
" 2 cases	"	"	"	105·2°

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The highest temperature shown in these diagrams occurs in the case of a lad aged seventeen (Diag. X). The case did not come under observation till the fifth day, so that it is not included in the two preceding tables. On the evening of the seventh day, the temperature was 105·8°, the pulse being at the same time of so moderate a frequency as 108. The case was a pretty severe one, but notwithstanding this very high temperature, there was nothing specially alarming in the symptoms. In only four of the twenty-seven cases did the temperature fail to attain an elevation of 104°.¹

With regard to the defervescence, the rule among the cases which I have observed has been that it is gradual. A sudden defervescence, occupying from twenty-four to thirty-six hours, and fully deserving to be denominated a crisis, has been quite an exception. The defervescence in Diags. III and XII approach most nearly to this character, and that in Diag. I would have been a fair example of crisis, but for the elevation of temperature on the 17th day ; so also would have been that in Diag. XI, but for a similar elevation of temperature on the 13th day. In the great majority of the cases the defervescence has occupied several

¹ The results of these observations are in some respects at variance with what is stated in Prof. Aitken's work 'On the Science and Practice of Medicine.' For example, it is said that "both in mild and in severe cases the temperature always rises above 104·7°, and it frequently reaches 106° Fahr. or more." It is also said (page 44) that a temperature below 103·3° Fahr., without any external cause, between the middle of the first and the middle of the second week, in a person under eighteen years of age, is conclusive against the case being one of typhus. In the cases shown in diagrams I, III, IX, and X, and more markedly in XII and XIII, cases in which there could be no doubt about the diagnosis, the temperature was found below this point between the fourth and tenth day.

days, and, as I have already stated, it is not regularly progressive. In one case (Diag. VII) it is very gradual and steady however, beginning on the 9th day, and terminating on the 13th, thus occupying four or five days. By reference to the diagrams, the character of the defervescence in each case will be readily seen; and any detailed description is unnecessary. In most of the cases the pulse during the defervescence pretty closely corresponds with the temperature in its fall towards the natural standard, particularly so in Diags. I, II, IV, VI, and XII. Occasionally there occurs what might be described as an unsuccessful attempt at a crisis, some days before the defervescence really commences, the temperature falling as much as three degrees or more, but rising again the same evening or next day to its former elevation. There is an example of this on the ninth day of the case shown in Diag. IX.

A most important point as a distinctive characteristic of the range of temperature in typhus, particularly as an element of diagnosis between that fever and enteric, is the period of the case at which the normal temperature is permanently regained. In some of the earlier cases observed, the notes of the temperature were discontinued too soon after it had become normal; for not very unfrequently after having been normal it again rises even several degrees, and does not again fall to the healthy standard till some days later; and this may occur independently of any complication. In the following statement, therefore, with reference to the date of termination of the fever, only those cases are included in which the temperature continued to be noted for at least two days after it had become normal, with the result of showing that it continued at or below this standard. Cases are also excluded in which there occurred any complication so serious that it might be expected materially to affect the range of temperature. The suitable cases then are fifty-three in number. Their respective ages are as follows:

1 case	.	.	.	.	.	.	5 years of age.
27 cases	.	.	.	.	.	.	10 to 19 "
18 "	.	.	.	.	.	.	20 ,, 29 "
4 "	.	.	.	.	.	.	30 ,, 39 "
3 "	.	.	.	.	.	.	40, 46 and 53 "

Of these fifty-three cases, the fever ended—

In 1 case on the 9th day.	In 9 cases on the 15th day.
" 1 " " 10th "	" 5 " " 16th "
" 5 cases " 11th "	" 5 " " 17th "
" 2 " " 12th "	" 6 " " 18th "
" 10 " " 13th "	" 2 " " 20th "
" 6 " " 14th "	" 1 case " 21st "

The diversity shown here as to the period of restoration of normal temperature is very great, from the ninth to the twenty-first day. Notwithstanding this diversity, however, the period at which the abnormal temperature ends will go far in the great generality of cases to establish the diagnosis between typhus and enteric fever. We find only three of these fifty-three cases protracted beyond the eighteenth day. The day on which the largest number of cases terminated was the thirteenth, but no particular day possessed any marked pre-eminence in this respect.

After the commencement of convalescence, the temperature very generally falls for a few days or longer below normal, being frequently 97° , not unfrequently 96° , and sometimes even lower. In the case of a man aged fifty-seven, it fell as low as 94.8° . A temperature so low will probably only be found to accompany, as it did in this case, a state of great danger to life; the grave nature of the case being manifest, however, without the aid of the thermometer. Under a liberal administration of whisky this patient gradually improved and finally recovered. The temperature rose very gradually, and five days after being at the low point mentioned was 97.8° .

An elevation of temperature about or after the commencement of convalescence is said to be frequently the first indication of the occurrence of some internal local inflammation. In one such case an elevation of temperature during and after the fourth week was found to accompany a pleurisy with effusion, which ultimately ended in death. The daily use of the thermometer may occasionally be useful in thus drawing attention to a complication which might otherwise have escaped notice; and any considerable elevation of temperature, when not to be expected in the ordinary course of the case, or still more when the temperature has already begun the descent towards the normal standard, should at once call for a careful examination of the patient, in search of some cause for the occurrence. The existence of some complication, either engrafted on the fever, as a pneumonia, or of old standing, as phthisis, will occasionally very much alter the range of temperature, and this must be borne in mind in cases where a doubt as to the diagnosis might so arise. Pleurisy may occur, however, without affecting the temperature; it supervened in one case of typhus after the convalescence had begun, the temperature nevertheless remaining natural; and I may mention in passing two other cases of pleurisy unconnected with typhus, in which the temperature was noted and found normal. One was a case of phthisis; there was severe pain in the chest catching the breath, loud friction murmur, and the pulse was 120: the other was a case of simple

pleurisy in a man about seventy years of age, in whose case the pulse, like the temperature, was normal.

Seven of the cases shown in these diagrams terminated in death.

In the case of A. M. (Diag. XV), the highest temperature was 104.5° , on the fifth day. There was nothing in the range of temperature to create any alarm, except perhaps that while it was falling, the pulse was rising. There was much delirium, floccitatio, muscular tremors, feeble dicrotic pulse, and albuminous urine with tube-casts. Death occurred on the ninth day.

In the case of P. D— (Diag. XVI), which was fatal on the twelfth day, the highest temperature was 103.6° on the eighth day. In this case, also, there occurred a falling temperature with a rising pulse. The cardiac sounds and the pulse were very weak, and there was coldness of the extremities and hiccup.

The case of W. D— (Diag. XVII) proved fatal on the twelfth day. So early as the sixth day the urine was found to be decidedly albuminous, contained abundant tube-casts, and was scanty in amount; and next day it was still more deficient. Notwithstanding these very unfavorable circumstances, the patient's aspect and other symptoms continued good till the tenth day. The highest temperature noted was 104.3° on the third day. There was nothing in the range of temperature to cause anxiety, except perhaps the fall on the sixth day, while the pulse rose, and this fall could scarcely be looked upon with suspicion, it being the period of the case when an abatement in the temperature was to be expected, and the pulse was by no means very rapid, being only 118.

In the case of M. L— (Diag. XVIII) the highest temperature was 102° on the third day. The temperature range was certainly very abnormally low, but the dangerous nature of the case was obvious without the aid of the thermometer.

The case of J. G— (Diag. XX) terminated in death on the sixteenth day. The highest temperature was 104.5° on the eleventh day. The only unfavorable symptom in the range of temperature was the fall on the fourteenth day while the pulse continued to vary between 132 and 144.

The case of J. A— (Diag. XXI) proved fatal on the eighteenth day. The highest temperature was 104.1° on the thirteenth day. While there was nothing abnormal in the range of temperature, the increasing frequency of the pulse up to the extreme rapidity of 166, and the severity of the other symptoms sufficiently declared the gravity of the case.

In the case of R. L— (Diag. XXII), there occurred a very abnormally low temperature with an extreme rapidity of pulse,

but here too the danger was obvious without the use of the thermometer.

The results of these observations do not lead me to lay much importance on the use of the thermometer as an aid to the prognosis of a case of typhus. Bad cases may present nothing extraordinary in the temperature range from beginning to end. On the other hand, in several of these cases there occurred a very high temperature early in the fever, notwithstanding which the cases did not prove in any way serious. For example, in Diag. I, the temperature was 104.9° on the 3rd day; in Diag. II, 104.8° on the 6th day, and 105° on the 9th; in Diag. III, 105° on the 5th and 6th days, and 104.8° on the 8th; in Diag. IV, 104.9° on the 5th day; in Diag. VI, 105° on the 7th day; in Diag. IX, 105.2° on the 3rd day; and in diag. X, 105.8° on the 7th day.

There is one circumstance which when it occurs to a considerable extent must be looked on suspiciously, that is a falling temperature with a rising pulse. An exceedingly high temperature, again, 106° or upwards, indicates a dangerous height of pyrexia, and an exceedingly low temperature at any period of the fever may be considered a symptom of failing power, but in either case, in order to form a correct judgment, the collateral symptoms must be considered, and particularly the pulse and cardiac sounds. Indeed, if any one symptom is more than another capable, when considered by itself, of conveying an idea of the amount of danger present, it is the state of the pulse, not merely as to its frequency, but also its strength, volume, and rhythm. The intensity of the febrile condition will be of course much most certainly estimated by means of the thermometer, but the danger to the patient is by no means constantly in proportion to the severity of the pyrexia. In a patient of excitable temperament, the typhus poison having been received into the system may light up a violent febrile state, but the various emunctory organs being in a healthy condition, and rapidly carrying off the morbid matter, there may be no danger to life during the whole course of the malady. In another patient, on the other hand, the feebleness of his constitution or the malignancy of the poison may be such that he is prostrated from the first onset of the disease, and his condition may be one of absence of much febrile reaction throughout. The temperature in such a case may present nothing out of the ordinary course, but a bad prognosis will in all probability be correctly formed from the state of the pulse and the general symptoms.

While holding this opinion as to the value of thermometric observation for purposes of prognosis, and therefore that the use of this instrument in the great majority of cases of typhus

is not of much practical service, I believe that every now and again a case will occur in which from absence of the characteristic eruption, for example, the diagnosis will be obscure, and that in such a case, with a rare exception, the employment of the thermometer will be of the greatest importance as an aid towards the formation of a correct judgment. Such an exception however may occur. For instance, had the specific rash been wanting in the cases of M. H— (Diag. XIII) and H. C— (Diag. XIV), in which cases the temperature was never observed higher than 102.8° , and in which it became normal so early as the ninth day in the one, and the tenth or eleventh in the other, the diagnosis of typhus could scarcely have been ventured upon. The rash was quite unmistakeable however, and could leave no doubt as to the real nature of the fever; and notwithstanding such cases must be very rare, their occurrence should render us very cautious how we lay down absolute laws founded upon observations however numerous.

Having referred so frequently to the cases shown in the diagrams, I will not allude to them further than to direct attention to Diag. VIII, as an instance of the occurrence of typhus almost immediately on recovery from enteric fever.

The range of temperature and its relation to the pulse in enteric fever, present several characteristics which differ very decidedly from what is observed in typhus; and these points of difference are such as to be frequently of the greatest service in contributing towards a correct diagnosis. The point in which they differ most conspicuously, perhaps, is the duration of the abnormal range of temperature; for while in the great majority of cases of typhus this has terminated by the middle of the third week, and in many cases considerably sooner; it is rare that it terminates in enteric fever before the fourth week, and it is not unfrequently protracted into the fifth, or even the sixth week. While referring to the duration of the fever, I would remark that it is frequently very difficult in enteric fever to fix the precise date of its commencement, the patient in many instances having felt his symptoms come on so gradually that he finds it impossible to say on what day they began. The onset of the fever seems to be more gradual than that of typhus, and the temperature during the earlier days is said to be less elevated than in that fever. This observation, however, would be of little value for diagnosis, for we have seen that in some cases of the latter fever the temperature is exceedingly moderate.

The evening temperature in enteric fever is almost constantly higher than that of the morning of the same day; there are occasional exceptions to this rule, but they occur much more

seldom than in typhus. The difference also between the morning and evening observations is greater. This holds good during the whole course of the fever, but it becomes very remarkable in the great majority of cases during a period which immediately precedes the settling down of the temperature to the standard of health. At this stage of the case, generally about the end of the third week, but varying of course according to the total duration, there occurs a series of oscillations between low temperatures in the morning and high temperatures in the evening, in which the difference may amount to five, six, or even seven degrees. This alternation may continue from a few days to a week or more, and when it is well marked may be considered as conclusively diagnostic of enteric fever.

Another peculiarity not unfrequently met with in enteric fever is the co-existence throughout the case of a slow pulse, occasionally very slightly if at all above its normal frequency, with the high fever temperature; this being sometimes 103° or higher, while the pulse is only 72 or even less.

The following Table shows the correlation of Temperature and Pulse in twelve cases of Enteric Fever, their respective ages being 14, 17, 17, 18, 21, 22, 22, 22, 25, 36, 37, and 44.

Temperature.	Number of observations.	Average pulse.	Highest and lowest pulse.
96.4° — 97°	18	78	48—120
97.1° — 98°	68	86	48—144
98.1° — 99°	83	91	48—132
99.1° — 100°	60	94	60—132
100.1° — 101°	58	97	54—132
101.1° — 102°	94	102	60—144
102.1° — 103°	137	105	72—132
103.1° — 104°	95	110	72—136
104.1° — 105°	23	112	84—144
105.1° — 106°	2		90—120

Though the number of observations is rather small, the table is interesting so far as it goes. By comparing it with that referring to typhus (p. 452) it will be observed that the average pulse with each degree of temperature, at least in its higher range, is somewhat lower, and the minimum pulse considerably so. The degree of temperature most frequently observed is also lower.

Having premised these few remarks as to the chief points of difference between the ranges of temperature in typhus and enteric fever, I will now direct attention, without going into the details of the cases, to the principal features which they present.

The case of G. B—, male, æt. 17 (Diag. XXIII), though somewhat short, was a very characteristic one of the enteric range of temperature. With two exceptions (tenth and eleventh days) the evening temperature was higher than the morning, and the difference between the two was considerable. The highest temperature observed was 103.8° (eighth and ninth day). The oscillation of temperature at the beginning of the third week was well marked. The case was a mild one, and terminated on the nineteenth day. The subsidence of the temperature proved that the rapid pulse which continued was not due to prolongation of the fever.

In the case of A. S—, male, æt. 22 (Diag. XXIV), the highest temperature observed was 103.7° , on the tenth day. Throughout there was no exception to the evening temperature being higher than that of the morning. The normal range of temperature was regained on the twenty-third day. The pulse was very slightly accelerated, being mostly about 84, and only once as high as 96. The notes cease on Nov. 1st, and the case is especially interesting from the patient taking ill of typhus on Nov. 12th, a few days after having left the hospital. This attack of typhus was also mild (see Diag. VIII), and taken along with this, furnishes a very good contrast of the ranges of temperature peculiar to typhus and enteric fever.

The case of M. P—, female, æt. 25 (Diag. XXV) was one of considerable severity. Notwithstanding this, it is an instance of the almost entire absence of one of the most prominent symptoms of enteric fever, the diarrhœa, which occurred on only one day, the fifteenth, the patient requiring several times castor oil and enemata to procure an evacuation. The evening temperature was, with a very few exceptions, higher than that of the morning. The oscillation of temperature towards the end of the case was not very well marked, continuing only over two days, but it occurred to a greater extent during the third week. At this period the case seemed to be tending towards convalescence, but on the eighteenth day a severe exacerbation occurred, and convalescence did not commence till the thirty-fourth day, making the total duration of the case five weeks. The highest temperature observed was 105° , and occurred on the twenty-second day.

The case of J. C—, female, æt. 18 (Diag. XXVI), was chiefly remarkable for the great oscillations of temperature throughout, at least from the period of its coming under observation. The highest temperature was 104.2° on the evenings of the tenth and fifteenth days. Convalescence commenced on the thirty-first day. With one exception the evening temperature was above that of the morning.

The next case, J. L—, male, æt. 36 (Diag. XXVII), was another of those characterised by a peculiarly low pulse. On Sept. 20th (the day of illness on admission could not be ascertained) the temperature was 103.6° , and with this exalted temperature the pulse was only 72. The highest temperature, 104° , occurred on the morning of the day of admission. The alternation of high and low temperatures was particularly well marked, and without exception the temperature was higher in the evening than the morning. Although the precise date of commencement was doubtful, yet from the specific eruption being present on admission, we cannot be far wrong in assuming at least eight days as the previous duration of the illness, which would put the beginning of steady convalescence (Oct. 4th) at the twenty-eighth day.

In the case of M. R—, female, æt. 18 (Diag. XXVIII), the date of commencement was also doubtful; but the day of admission was probably at least the eighth. The highest temperature, 105.7° , occurred on the evening of the ninth (?) day. Up till April 26th (twenty-fourth (?) day), which was probably about the termination of the fever, the evening temperature was invariably above that of the morning. When the notes ceased the temperature continued above that of health, its elevation being probably due to tuberculosis.

In the case of J. B—, male, æt. 21 (Diag. XXIX), there was less variation between the morning and evening temperatures than in most of the others, and the evening temperature was not so constantly above that of the morning. The highest temperature noted was 104.5° on the evening of the fourteenth day. The last stage of the fever was somewhat protracted, and convalescence was not steady until the thirtieth day.

The following case, that of C. D—, male, æt. 23 (Diag. XXX), was also a long one. With three exceptions, the evening temperature was higher than that of the morning. The highest temperature observed was 103.6° , on the evenings of the twentieth and the thirty-second day. Steady convalescence did not commence till the thirty-ninth day.

The case of T. S—, female, æt. 22 (Diag. XXXI), was a somewhat peculiar one. Considering its duration, it more resembled typhus than enteric fever. The oscillation of temperature occurred most unusually early, between the tenth and fifteenth days, and the normal range of temperature was regained so soon as the seventeenth day. The general symptoms however, namely, the diarrhœa, the characteristic eruption, the ilio-cæcal tenderness, and gurgling on pressure, were such as to make the diagnosis quite clear. Notwithstanding the short duration, the case was by no means a mild one, and

the general symptoms as well as the temperature in its earlier stages were such as would have led to the expectation of a protracted illness. The highest temperature noted, $104\cdot7^{\circ}$, occurred on the evenings of the sixth, tenth, and fourteenth days; and the evening temperatures are with a few exceptions higher than the morning.

The last case to which I will direct attention (Diag. XXXII) was an example of the co-existence of typhus and enteric fever. The character of what little appearance there was on the skin when the case came under observation, the diarrhœa during the latter half of the second week, the ilio-cæcal tenderness, the late appearance of the typhus rash, the unmistakeable appearance of that rash, and, lastly, the advanced period of the case before the temperature had regained its normal standard, all in my opinion go to establish this diagnosis. It is confirmed by the range of temperature, which is rather irregular; it was frequently lower in the evening than in the morning, and had not become steadily normal by the twenty-fifth day.

My impression is that the principal value of the thermometer is, in enteric fever as in typhus, diagnostic, and that for prognosis our reliance must be in a careful consideration of all the symptoms presented by the case; among these of course the temperature will have a place, but not, I believe, the pre-eminence which is by some observers ascribed to it.

In conclusion, the leading diagnostic points between the range of temperature of typhus and that of enteric fever, may be briefly stated as follows:

Typhus Fever.

The duration of elevated temperature is very rarely beyond eighteen days; it is generally shorter by several days, and may be even so short as nine days.

The evening temperature is frequently lower than that of the morning.

The difference between the morning and evening temperature, during the height of the fever, or from about the third to the tenth or eleventh day, is comparatively seldom above one degree, and although about the period of deferescence the difference is sometimes much greater, the oscillation is not continued over more than one or two days.

A high temperature is, as a rule, accompanied by a high pulse.

Enteric Fever.

The duration of elevated temperature is very rarely less than twenty-one days; it is generally longer, and may be protracted to thirty-five days or even more.

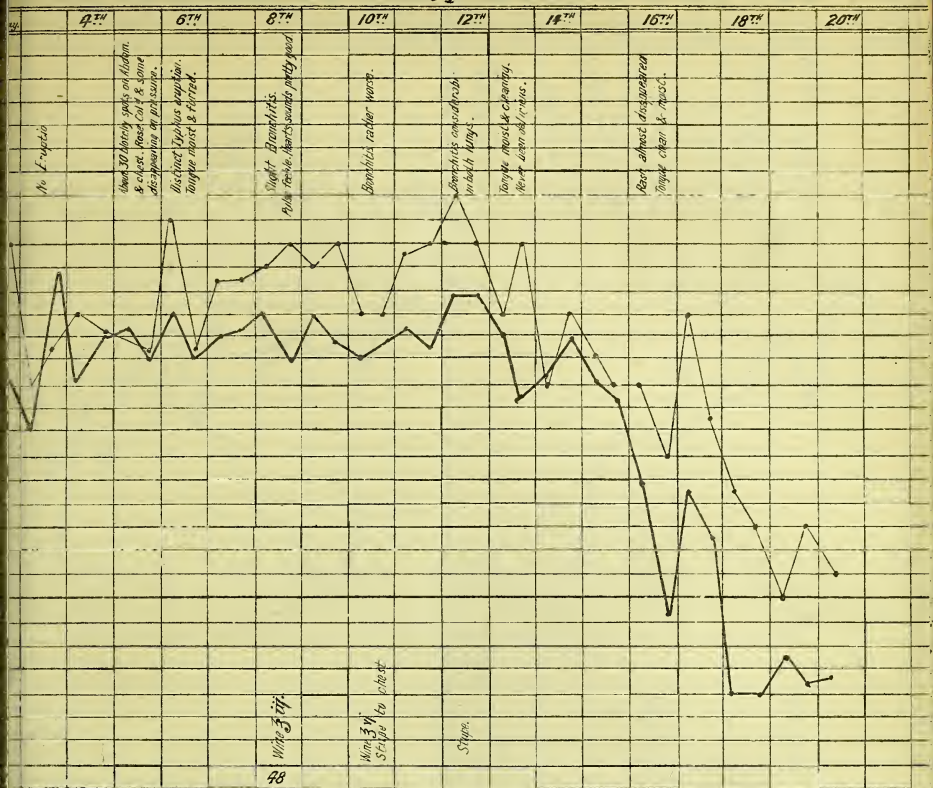
The evening temperature is almost constantly higher than that of the morning.

The difference between the morning and evening temperature is generally, throughout the case, greater than in typhus, and towards the end of the fever there occurs the very characteristic oscillation of temperature, during which the difference is frequently five, six, or even seven degrees, and which may continue from a few days to a week or more.

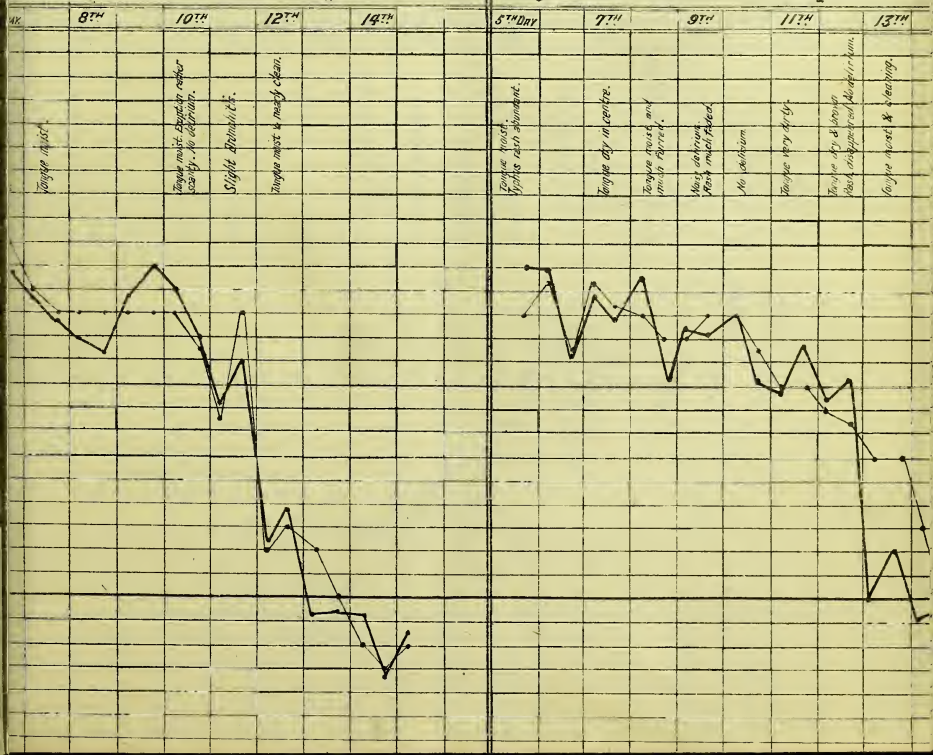
A high temperature is frequently accompanied by a pulse but slightly accelerated, and occasionally by a pulse slower than normal.

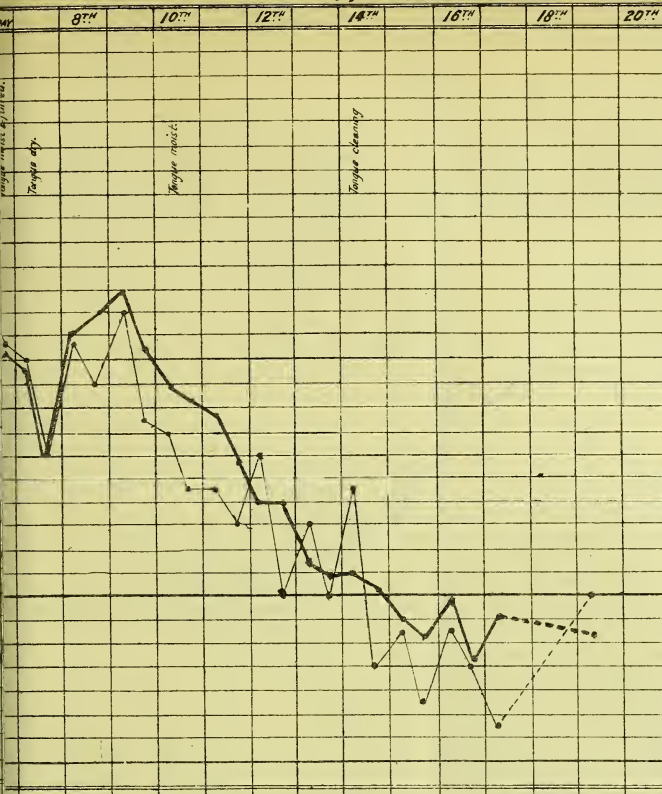
I take this opportunity of expressing my thanks to Drs. Anderson and White for the trouble they have taken in observing and noting the cases.¹

¹ This paper was read before the Dundee Medical Society, 8th January, 1868.



II. - J.G. Female. Oct. 21. Typhus. Recover. Diag. III. M.B. Female. Oct. 12. Typhus. Recover.





VIII. A.S. Male, Oct. 22. Typhus. Recov. Diag. IX. M.J. Female, Oct. 15. Typhus. Recov.

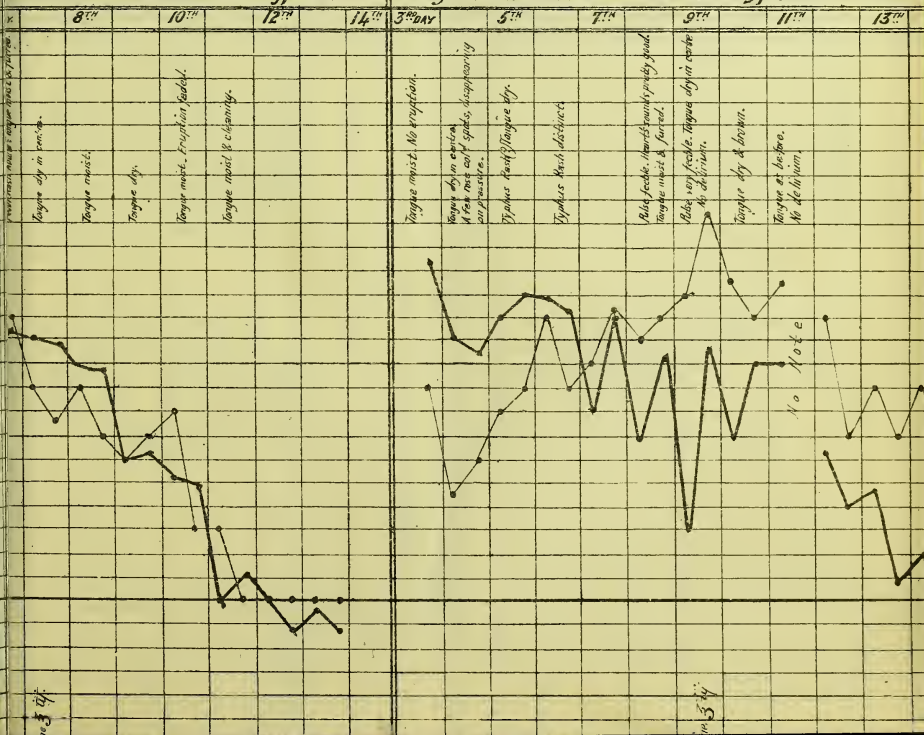


Fig. X. R.M. K. Male. Oct. 17. Typhus. Recov^d

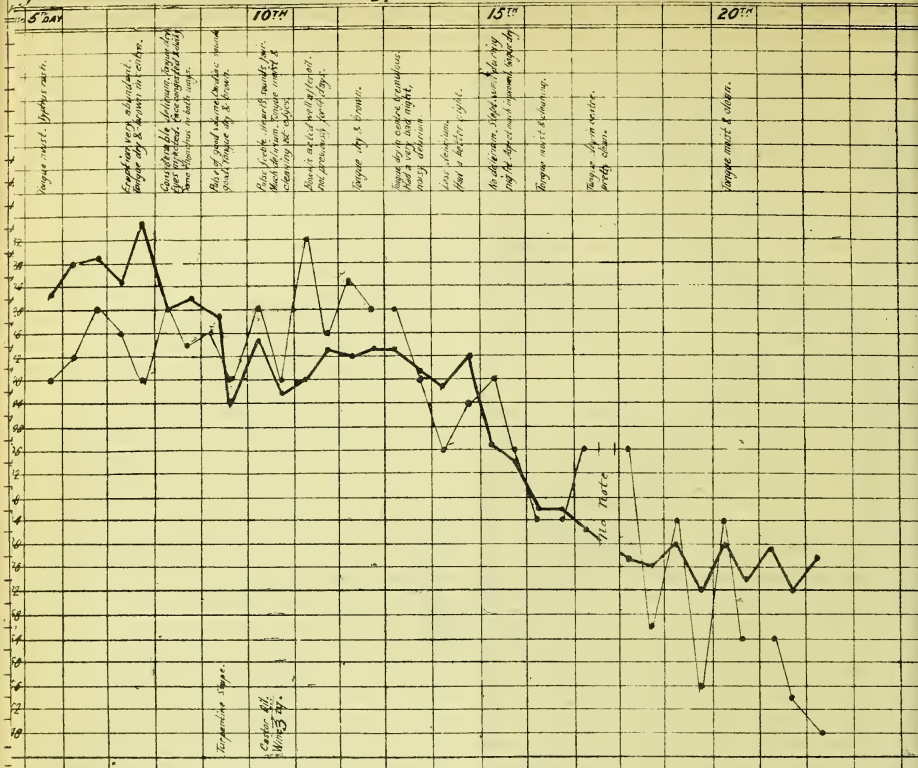


Fig. XI. B.L. Female. Oct. 14. Typhus. Recov^d

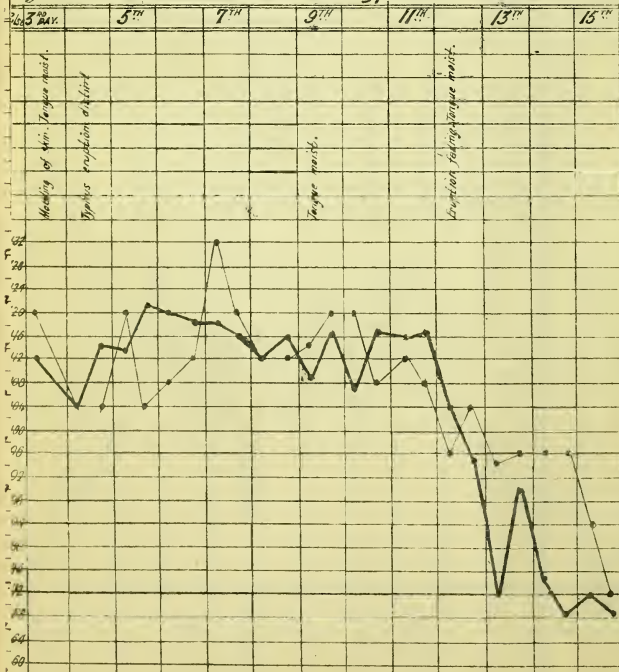
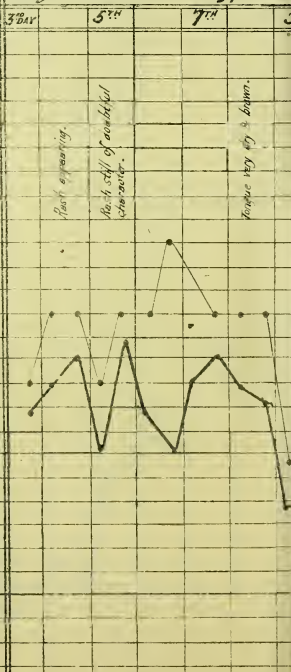
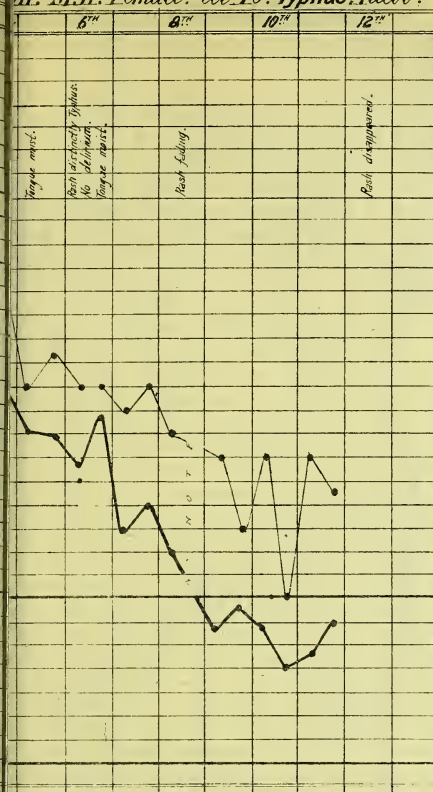


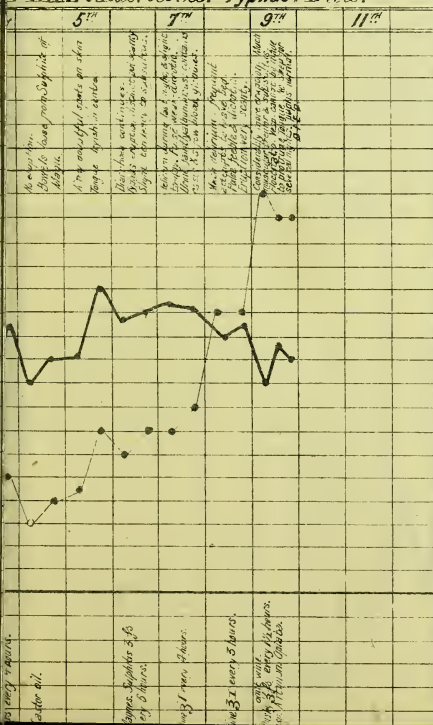
Fig. XII. Male. Oct. 12. Typhus. Recov^d



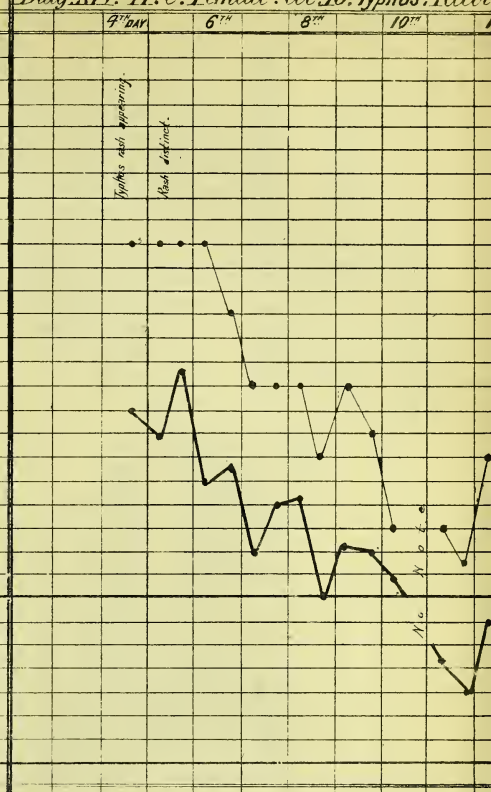
III. M.H. Female. Oct. 16. Typhus. Recovered



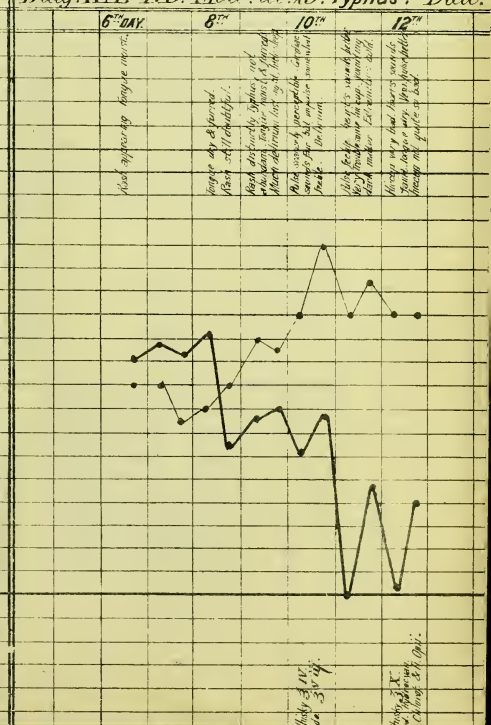
V. A.M. Male. Oct. 23. Typhus. Died.



Diag. XIV. H. C. Female. Oct. 18. Typhus. Recovered

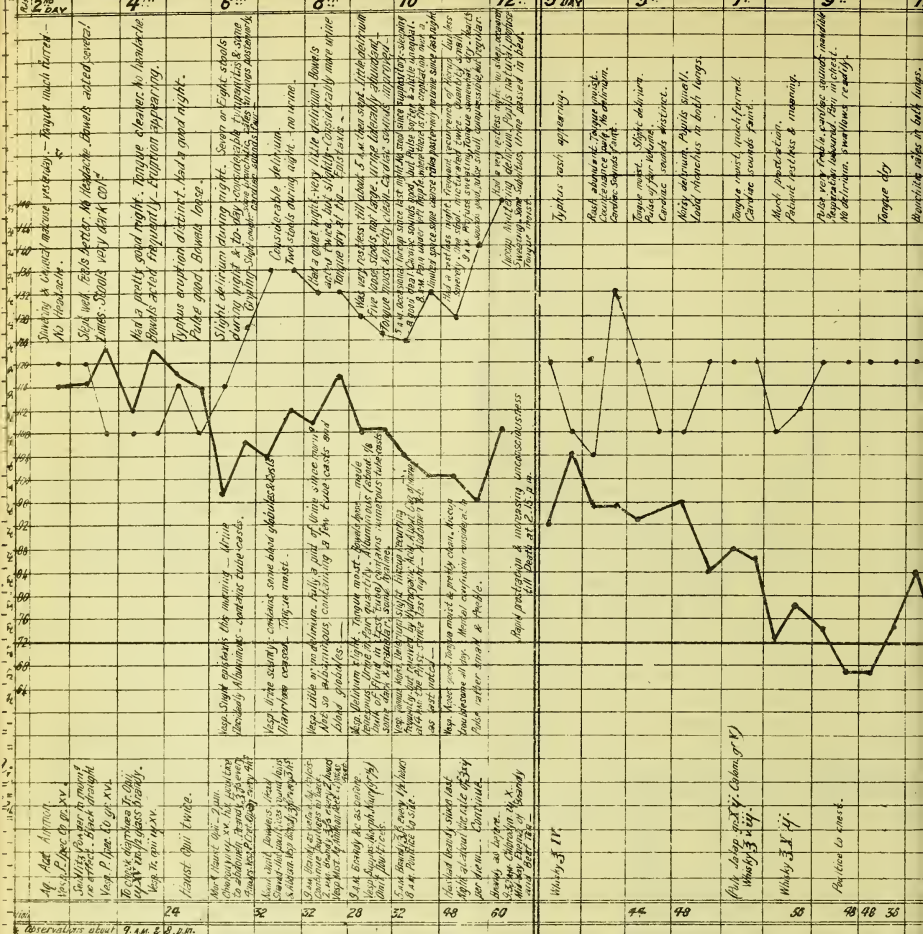


Diag. XVI. P.D. Male. Oct. 29. Typhus. Died.

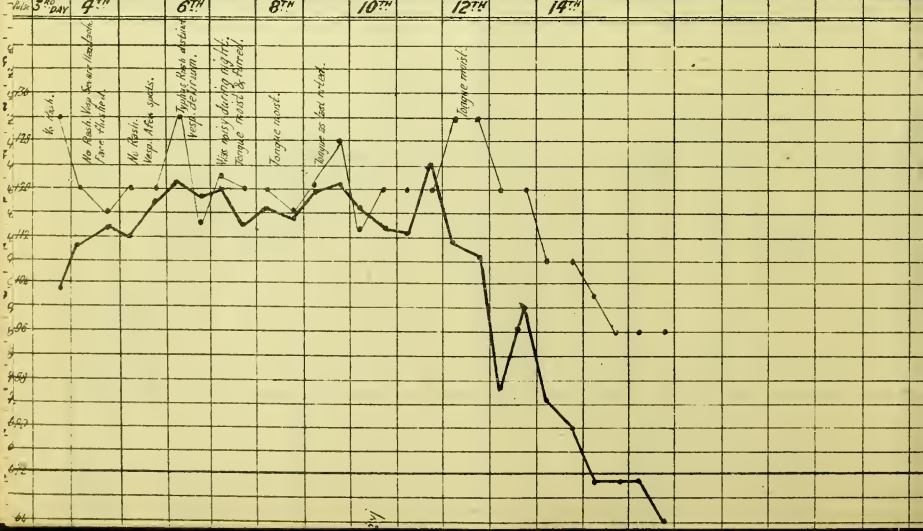


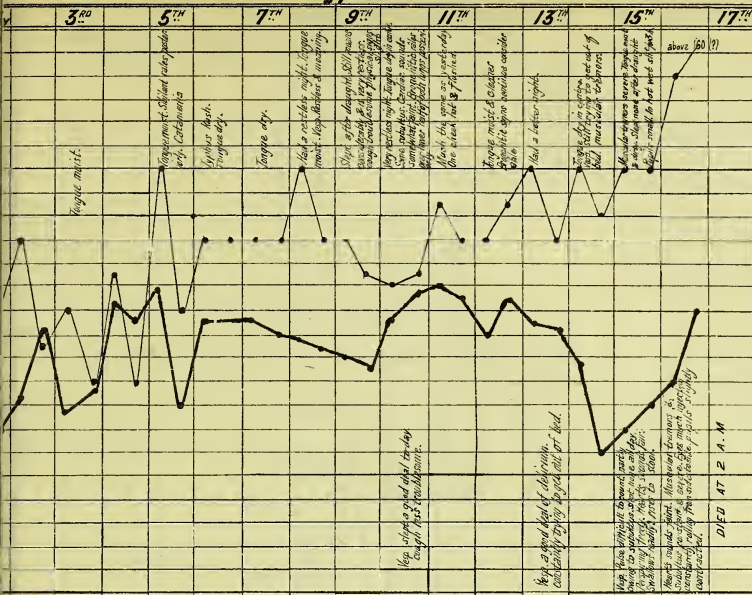
W.D. Male. Aet. 32. Typhus. Died.

Diag. XVIII. M.I. Male. Aet. 60. Typhus.



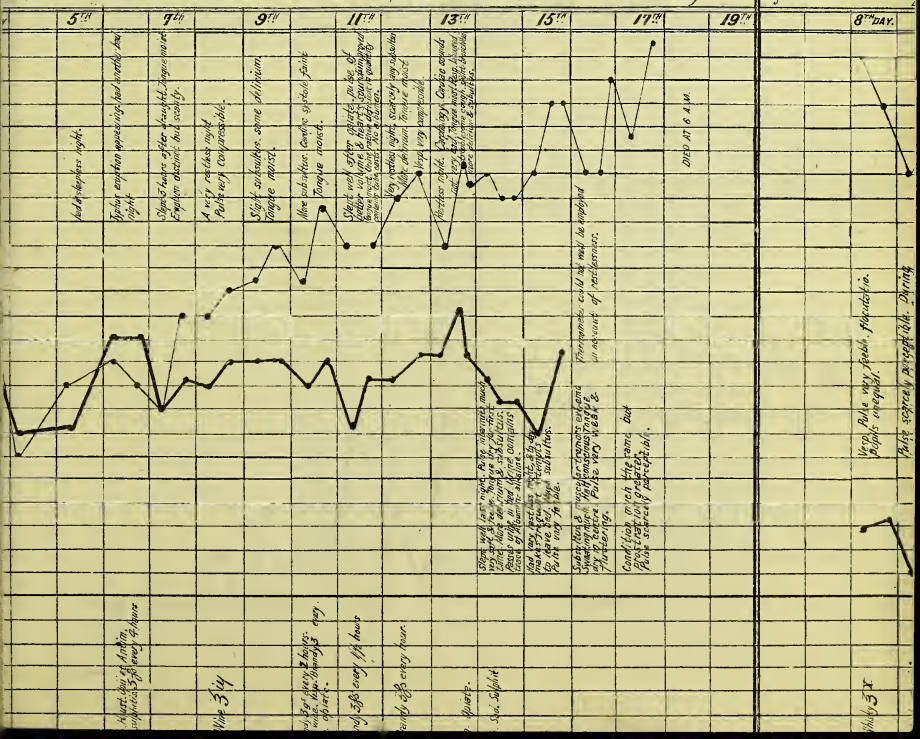
Diag. XIX. J.G. Female. Aet. 28. Typhus. Recovered.



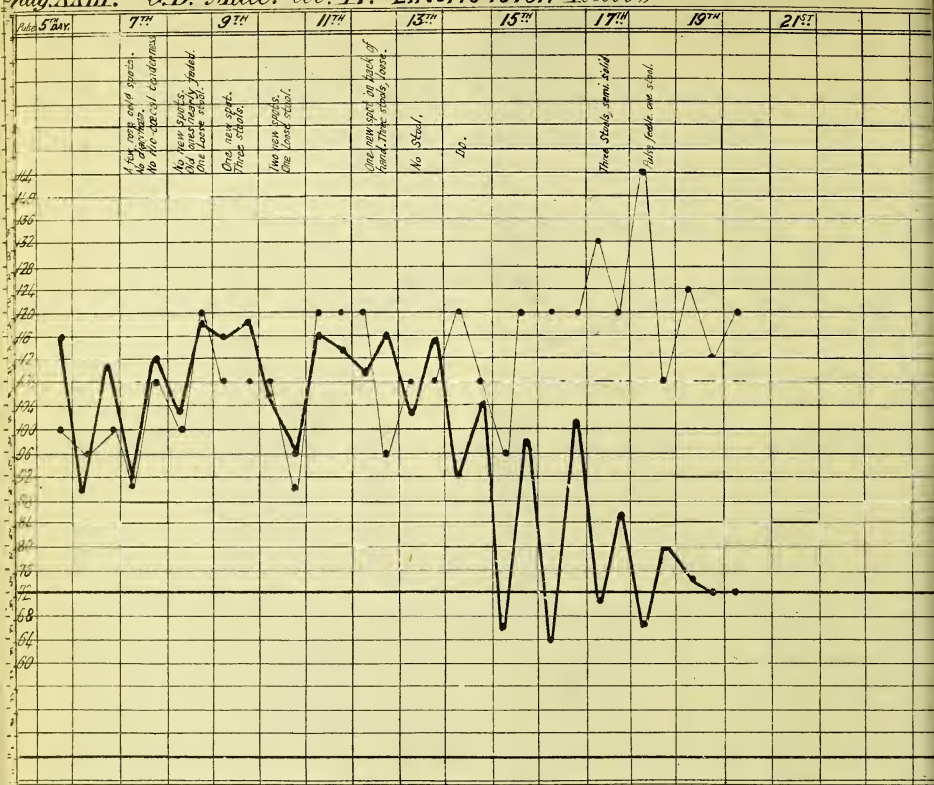


DIED	AT	2	A. M
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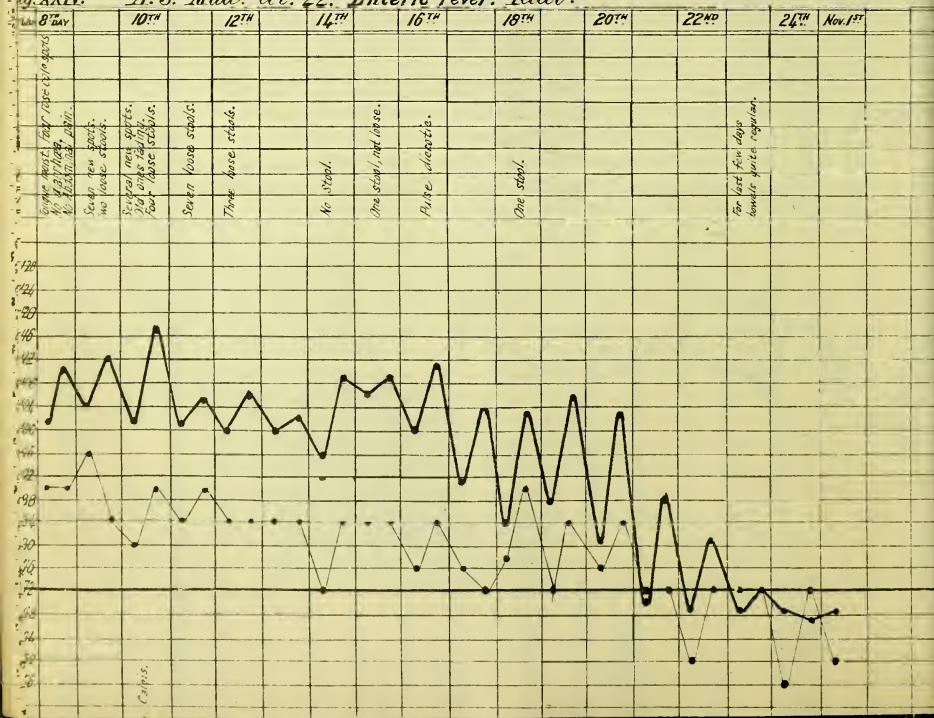
XI. J.A. Male. Aet. 40. Died. (observations about 10. A.M. & 8. P.M.)



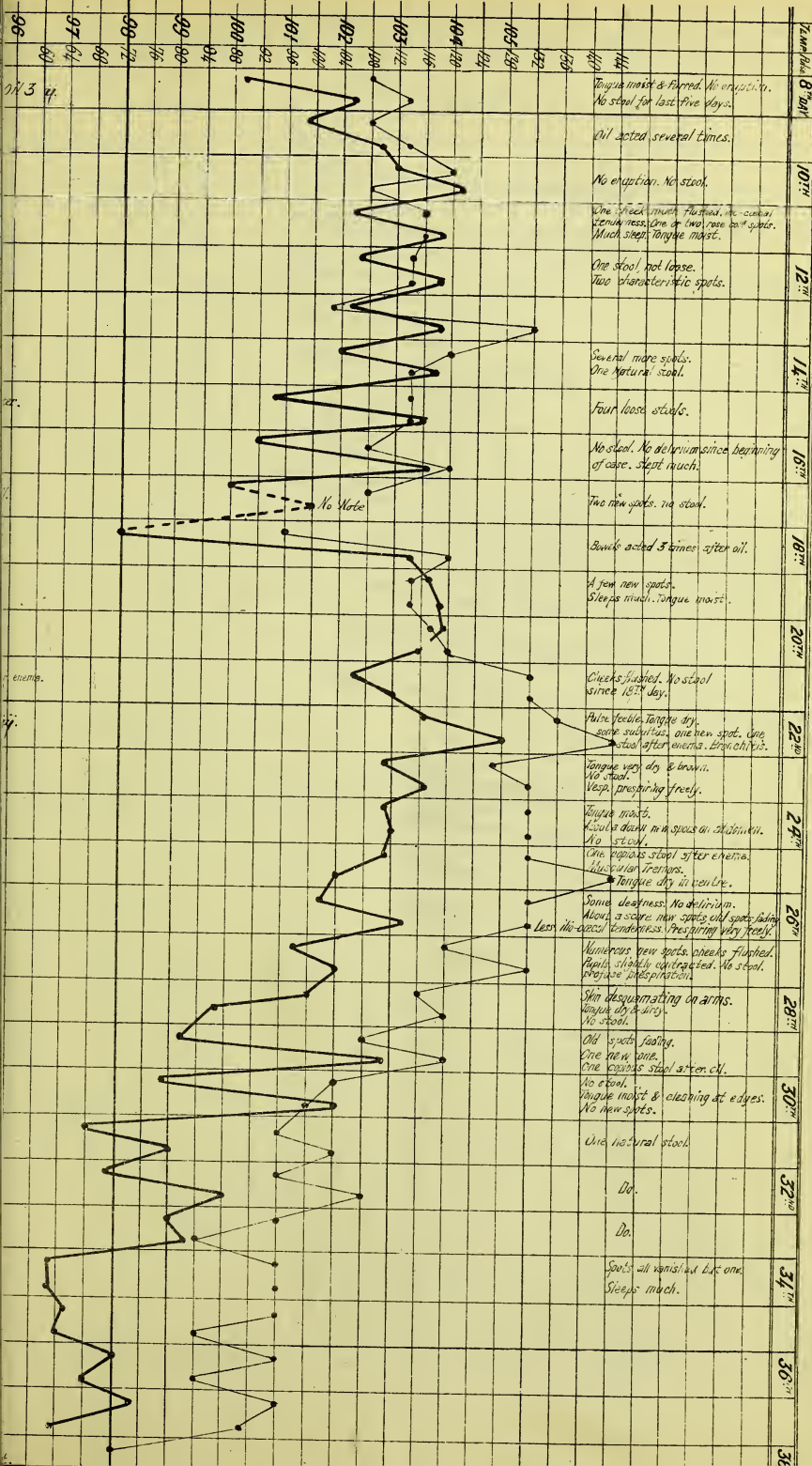
diag. XXIII. G.B. Male. Oct. 17. Enteric fever. Recov^d



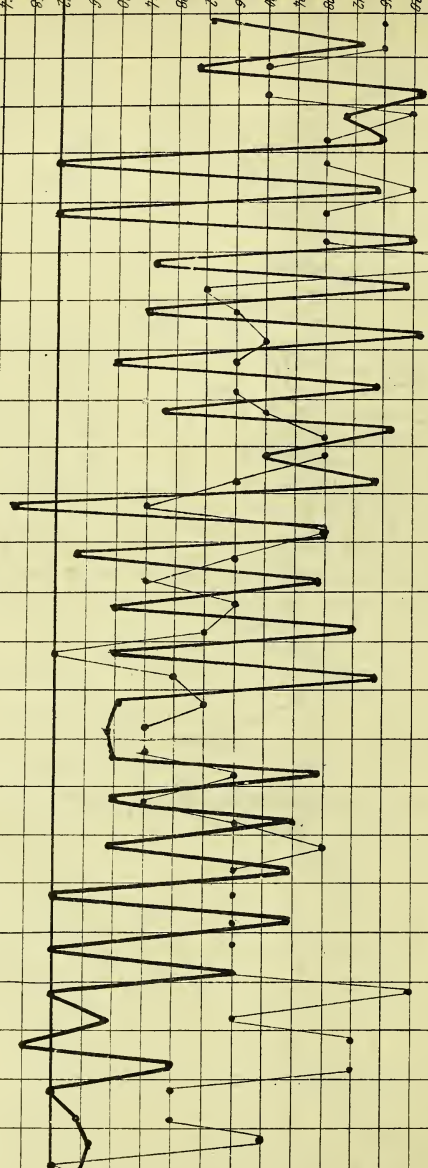
diag. XXIV. A.S. Male. Oct. 22. Enteric Fever. Recov^d



Diag. XV. M.P. Female. Oct. 25. Enteric Fever. Erased



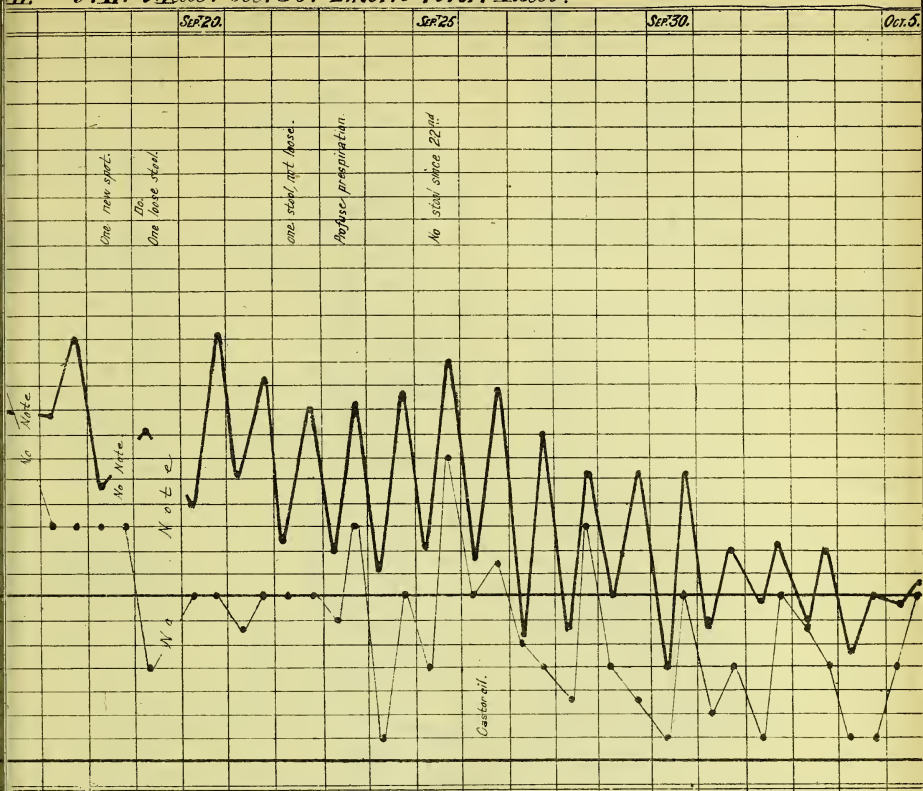
100 98 96 94 92 90 88 86 84 82 80 78 76 74 72 70 68 66 64 62 60 58 56 54 52 50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0



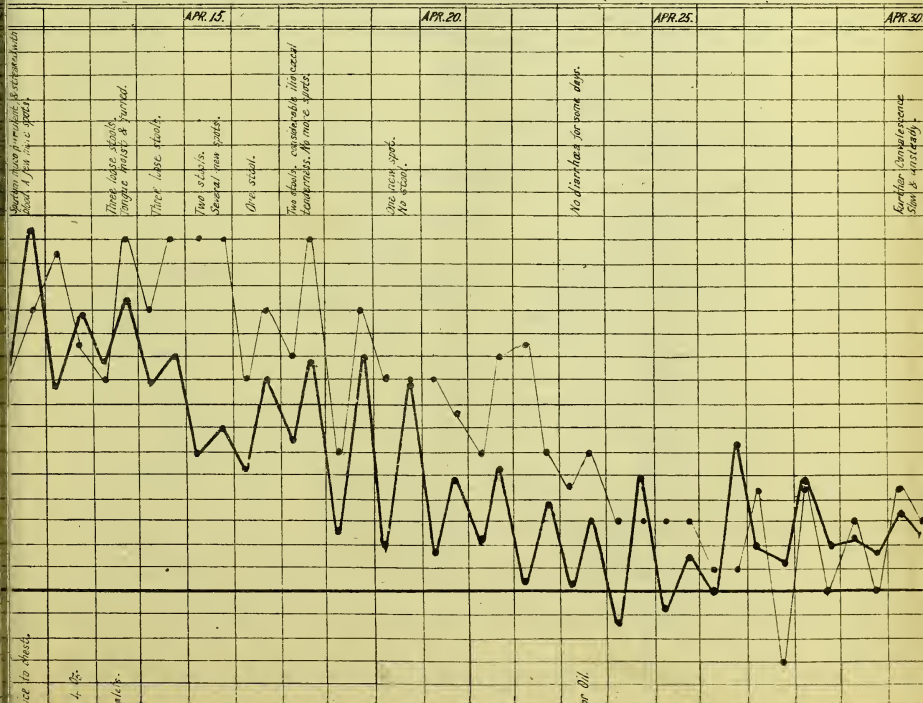
Three loose stools since last night.
 Several Rose col. spots.
 Several loose stools.
 Several new spots. Diarrhoea continues
 Tongue Moist.
 Several new spots
 Four loose stools.
 One stool.
 Several new spots,
 Tongue moist & clean.
 One stool, not loose.
 One stool not loose,
 Tongue moist.
 Two loose stools.
 No stool.
 No stool.
 Tongue moist & clean.
 No stool.
 No stool.
 No stool.
 No stool.
 one stool.

01. Rinin 3 1/2

VII. J.I. Male. Oct. 36. Enteric Fever. Recov^d



VIII. M.R. Female. Oct. 18. Enteric Fever. Recov^d



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Stomach to abdomen.
Nares plugged.

Pulse Alpac. Co. g^o 11th N^o 24
One every 4 hours.

Wine 3 IV

Ap. Calais.

Vacu. Much anisim. Pupils normal.
Pulse discreta.

Spec. he has had diarrhea. Two doubtful
Hidradema. Epistaxis. No stool to-day.
Tongue dry.

No stool. Tongue dry.

Several new rose cold spots. Two
not loose. Tongue dry. Pulse strong.

Two stools. Tongue dry in centre. No
stools. 6 loose. Pupils dilated. No cold
cold spots on trunk & limbs. Pupils of
slightly contracted. No delirium. Slight.

Five stools. Tongue dry & clean.
No delirium.

Four loose stools. Tongue as before.
Stools wet.
No delirium.

Five loose stools. Tongue dry.
Numerous new spots.
Slight ilio-cacal tenderness.

Five loose stools.
Several new spots.
Tongue dry in centre.

Pulse diastolic.

Five loose stools. Slight delirium.
Loud chancous in lungs.
Heard sounds fair.

Five loose stools. Desquamation of
spots fading. Less ilio-cacal pain.
Delirium.

4 stools.
Tongue dry.

3 loose stools.
Tongue moist.

2 stools.
Tongue dry.

Two loose stools.
Tongue dry.

Three loose stools.
Slight delirium during night.

Three loose stools. Tongue dry.
Slightly lighted.
Cuticle desquamating.

Three loose stools. Tongue moist.
Pulse weak.

No stool.

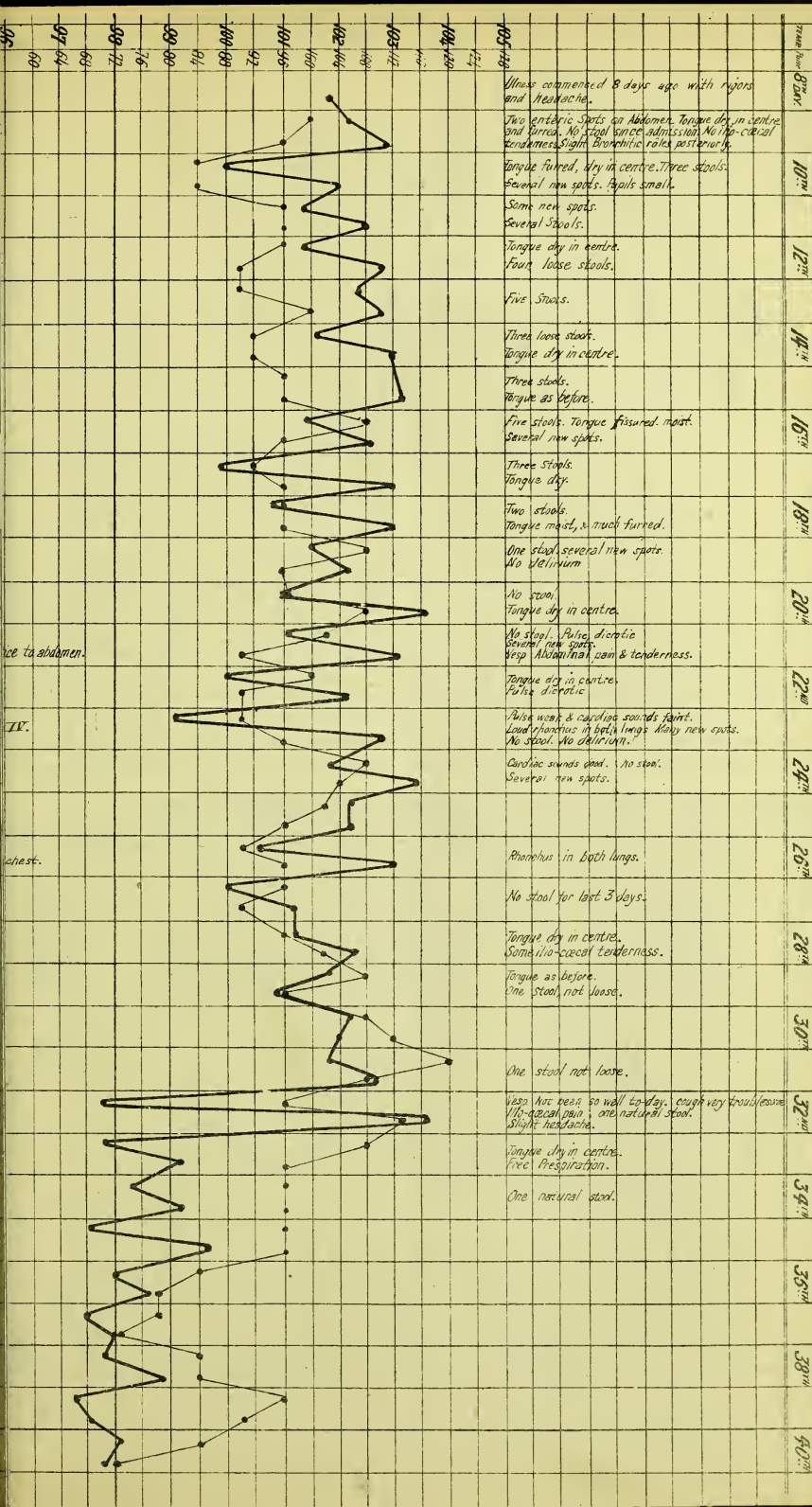
Do

Do

One stool not loose.
Tongue moist.

One stool.

Diag. XXV. C. D. Male. Oct. 23. Enteric fever. *Prova*



Illness commenced 8 days ago with rigors and Headache.

Two enteric spots on Abdomen. Tongue dry in centre and furred. No stool since admission. No ilio-caecal tenderness. Slight Bronchitic rales posteriorly.

Tongue furred, dry in centre. Three stools: Several new spots. Fapils small.

Some new spots. Several Stools.

Tongue dry in centre. Four loose stools.

Five Stools.

Three loose stools. Tongue dry in centre.

Three stools. Tongue as before.

Five stools. Tongue fissured. moist. Several new spots.

Three stools. Tongue dry.

Two stools. Tongue moist, & much furred. One stool, several new spots. No Delirium.

No stool. Tongue dry in centre.

No stool. Pulse diastolic. Several new spots. Vesp Abdominal pain & tenderness.

Tongue dry in centre. Pulse diastolic.

Pulse weak & cardiac sounds faint. Loud rharctus in both lungs. Many new spots. No stool. No delirium.

Cardiac sounds good. No stool. Several new spots.

Rhephus in both lungs.

No stool for last 3 days.

Tongue dry in centre. Some ilio-caecal tenderness.

Tongue as before. One stool, not loose.

One stool, not loose.

Vesp has been so well to-day, cough very troublesome. Ilio-caecal pain; one natural stool. Slight headache.

Tongue dry in centre. Free Respiration.

One natural stool.

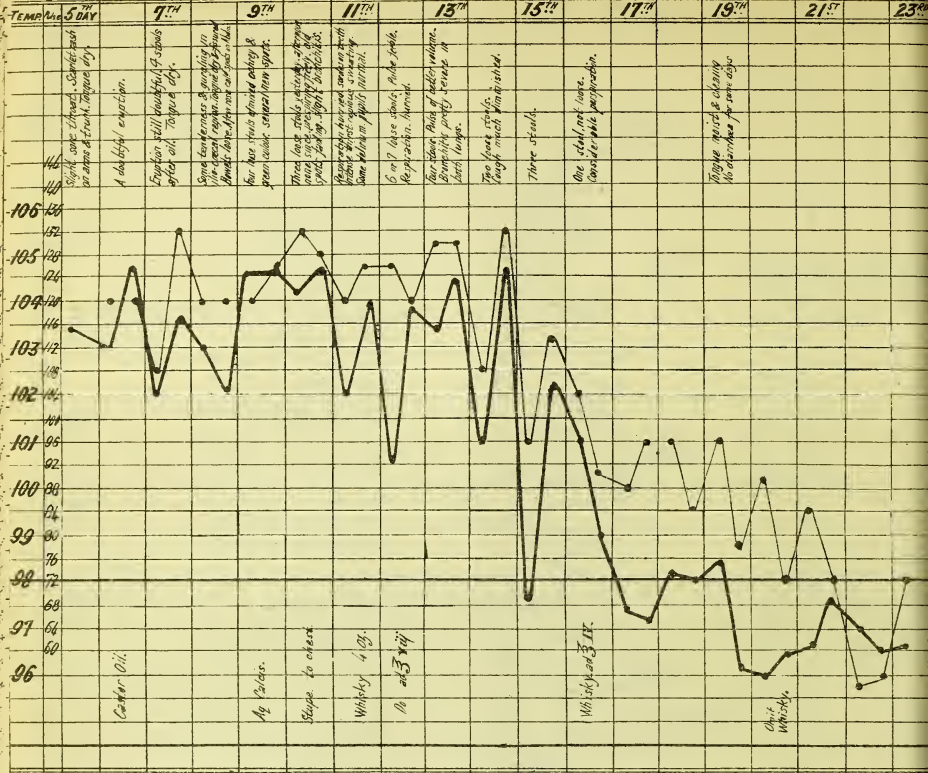
ice to abdomen.

IV.

chest.

7 AM 8 AM 10 AM 12 PM 1 PM 3 PM 5 PM 7 PM 9 PM 9:30 PM

Drag XXXI. T. S. Female. Oct. 22. Enteric fever. Recover.



Drag XXXII. C. M. - Female. Oct. 14. Enteric with Typhus. Recover.

